

What is claimed is:

1. In a head cell apparatus having plural vertically aligned trays that each receive and treat wastewater, a duct for conveying influent to be treated to the apparatus, the duct comprising:
 - 5 an inlet end connectible to an influent channel positioned at a level above the head cell apparatus; and
 - an outlet end positioned downstream of the inlet end and connectible to the head cell apparatus, the outlet end comprising a plurality of discrete nozzles corresponding in number to the plurality of trays, the nozzles being spaced in a vertical direction and each 10 having at least one orifice, the orifices being positionable relative to the trays such that influent entering the inlet end of the duct travels downwardly and exits the outlet end through the orifices into the respective trays.
 2. The duct of claim 1, wherein the nozzles define respective chambers 15 each having a substantially rectangular cross-section.
 3. The duct of claim 1, wherein at least one nozzle is separated from an adjacent nozzle by a separation region.
 - 20 4. The duct of claim 3, wherein the at least one separation region is defined by a rounded projection extending from two adjacent nozzles and directed in a generally upstream direction.
 5. The duct of claim 4, wherein the projection has an upper side and a 25 lower side, and wherein the upper side is more rounded than the lower side.
 6. The duct of claim 1, further comprising an adapter section extending downstream from the inlet end, the adapter section defining a passageway having a cross-sectional area that changes over a length of the adapter section.

7. The duct of claim 6, wherein the cross-sectional area of the passageway of the adapter section generally decreases in the downstream direction.

8. The duct of claim 6, wherein an interior of the adapter section has a 5 sloped bottom surface.

9. The duct of claim 6, wherein an interior of the adapter section has a bottom surface that slopes downwardly in the downstream direction.

10 10. The duct of claim 6, wherein at least part of the adapter section has an open top.

11. The duct of claim 1, further comprising a drop section that defines a chamber having a substantially constant cross-sectional area along its length.

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12. The duct of claim 6, wherein a cross-section of the passageway changes over a length of the adapter section in the downstream direction.

13. The duct of claim 12, wherein the cross-section of the passageway 20 decreases in vertical dimension and increases in horizontal dimension in the downstream direction.

14. The duct of claim 1, further comprising a distribution section that terminates at the orifices of the nozzles at the outlet end of the duct, the distribution section 25 having an upstream portion defining a single chamber from which influent flowing therethrough is distributed among the multiple nozzles.

15. The duct of claim 14, wherein the distribution section defines chambers that extend along a curved path in a horizontal plane.

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16. The duct of claim 14, wherein the distribution section defines chambers that extend along an angled path in a horizontal plane.

17. The duct of claim 14, wherein the distribution section defines 5 chambers that extend along a substantially straight path in the horizontal plane.

18. A head cell entry duct for conveying influent to be treated to a head cell having a plurality of vertically spaced trays, the duct comprising:

10 head cell apparatus;

a first section extending from the inlet end downstream in a flow direction to a first junction, the first section defining a passageway having a cross-sectional area that decreases in the flow direction, the passageway having a top surface that is open over at least a portion of a distance between the inlet end and the first junction;

15 a second section adjacent and downstream of the first section, the second section defining an interior chamber and terminating at a level below the first section; and

a third section adjacent and downstream of the second section, the third section having a respective plurality of nozzles that each define a chamber terminating at an orifice at the outlet end of the duct, the nozzles being connectible to the plurality of trays of 20 the head cell apparatus.

19. A method of conveying influent to a head cell having multiple trays aligned in a vertical direction, the method comprising:

25 providing an influent source at a level above the head cell; channeling influent from the influent source into the duct;

changing a velocity of the influent by channeling the influent through a portion of the duct having a changing cross-sectional area; and

separating the influent into multiple flows and conveying the multiple flows to the respective multiple trays.

20. The method of claim 19, wherein the act of changing a velocity includes increasing the velocity of the influent to a predetermined velocity.

21. The method of claim 20, wherein the influent is maintained at the 5 predetermined velocity over its downstream course.

22. The method of claim 20, wherein after the influent reaches the predetermined velocity, its velocity remains substantially constant.

10 23. The method of claim 20, wherein upon reaching the predetermined velocity, the influent is guided by the duct through a drop in level, and wherein the influent velocity remains substantially constant.

24. The method of claim 19, further comprising conveying the influent 15 through a drop in level with a portion of the duct that slopes downwardly.

25. The method of claim 19, wherein the influent flows from the influent source and through the duct without substantial head loss.

20 26. A method of conveying influent to a treatment apparatus, comprising: providing an influent source at a level above the treatment apparatus; conveying the influent with a duct along a flow path from the influent source to the treatment apparatus; and along the flow path, distributing the influent into multiple 25 independent flows at different levels below the source.

27. A downward feed head cell assembly for removing grit from wastewater, comprising:

30 a plurality of vertically-spaced trays, each of the trays having an upper periphery, a downwardly directed conical portion with a terminal end defining an exit opening, and an inlet opening formed in a side of the tray adjacent the upper periphery;

5 a passageway through which influent is conveyed from a source at a level above a topmost one of the trays to each of the trays, the passageway having an inlet end that receives influent from the source and an outlet end lower than the inlet end, the outlet end having a corresponding plurality of nozzles, each of the nozzles being attached to a respective tray at the inlet opening,

10 whereby influent in the passageway is distributed into multiple flows through the nozzles and into the trays, the influent entering each tray through the inlet opening and establishing a flow that follows the conical surface, the grit in the influent settling toward the exit opening in the tray while the grit-reduced influent is discharged as effluent through the space between the tray and any overlying tray.

28. The head cell assembly of claim 27, wherein the passageway is substantially head loss free.

15 29. The head cell assembly of claim 27, wherein the passageway has a section with a decreasing cross-sectional area that increases a velocity of influent flowing through the first section to a predetermined design velocity.

20 30. The head cell assembly of claim 29, wherein the predetermined design velocity is about 5 ft./sec.